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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/854,924	05/14/2001	Toshihisa Yokoyama	782_163	7936

25191 7590 01/15/2003

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EXAMINER

SONG, MATTHEW J

ART UNIT PAPER NUMBER

1765

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/854,924

Applicant(s)

YOKOYAMA ET AL.

Examiner

Matthew J Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imaeda et al (US 5,919,304) in view of Ciszek et al (US 4,075,055).

Imaeda et al discloses melting a raw material of potassium carbonate, lithium carbonate and niobium oxide in an upper furnace at a temperature of 1100-1200°C and a lower furnace at a temperature of 500-1000°C (col 14, ln 45-67 and Fig 9). Imaeda et al also discloses a nozzle portion of a crucible, a driving mechanism for holding and moving a seed crystal and a mechanism for moving a grown oxide series single crystal (col 15, ln 1-14 and Fig 9). Imaeda et al also discloses at the time of seeding, a seed crystal is contacted to a surface of a melt at the lower end of a nozzle portion and a single crystal fiber was grown at a contact rate of 80 mm/hr by a mu pulling down method (col 15, ln 15-50 and col 17, ln 45-58). Imaeda et al also discloses a quality of a single crystal can be maintained by obtaining a single crystal under a gradual annealing of a low cooling rate of 100-400°C/hr.

Imaeda et al does not teach providing a cooling mechanism for directly cooling the oxide single crystal.

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In a method of growing a crystal ribbon from a die, Ciszek et al teaches for wider ribbons of greater than 4 centimeters auxiliary cooling techniques are required to assure the desired temperature distribution across the crystal at the solid liquid interface during growth, where cooling is achieved by directing a flow of inert gas in different controlled amounts to different segments of the liquid solid crystal interface so as to maintain the desired growth temperature across the growing body's interface. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Imaeda et al with Ciszek et al's cooling because larger ribbons are formed.

Referring to claim 2, the combination of Imaeda et al and Ciszek et al teaches cooling, where cooling inherently removes ambient heat.

Referring to claim 3, the combination of Imaeda et al and Ciszek et al teaches a flow of inert gas.

Referring to claim 4-5, the combination of Imaeda et al and Ciszek et al teaches a nozzle at the tip of a crucible.

Referring to claim 6-9, the combination of Imaeda et al and Ciszek et al teaches a fiber and a ribbon, this reads on applicant's planar form.

Response to Arguments

3. Applicant's arguments filed 11/5/2002 have been fully considered but they are not persuasive.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the

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teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the Ciszek reference teaches a method of growing larger single crystals by blowing a cooling medium to a liquid-solid crystal interface. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Imaeda et al with Ciszek et al to form larger crystals, which is well-known desirable feature in the single crystal art.

In response to applicant's argument that the Imaeda reference teaches away from a direct cooling step as taught by Ciszek reference has been considered but has not been found persuasive. The Imaeda reference does teach the occurrence of cracks and deterioration of the single crystallinity of single crystals are caused by thermal stresses acting upon the single crystal when rapidly exposed to an atmosphere of around room temperature. However, the Ciszek reference does not expose the single crystal to an atmosphere around room temperature. The Ciszek reference teaches directly flowing inert gas to different controlled amounts to different segments of the liquid solid crystal interface so as to maintain the desired growth temperature across the growing body's interface (col 5, ln 15-20). Ciszek et al teaches maintaining a growth temperature by cooling different segments of a liquid solid interface. It would have been obvious to a person of ordinary skill in the art at the time of the invention to maintain temperature uniformity across the growing body's interface. Furthermore, the Imaeda reference teaches a high temperature gradient is not desirable **after** growing the single crystal (col 7, ln 65 to col 8, ln 5), while the Ciszek reference teaches cooling a **growing** body's interface.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
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MJS
January 14, 2003


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
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